

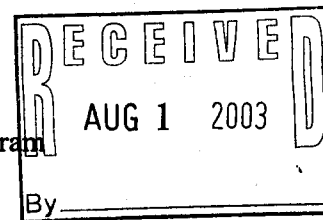
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## FACT SHEET

Regarding an NPDES Permit To Discharge to Waters of the State of Ohio  
for the U.S. Department of Energy

Public Notice No.: 03-03-073  
Public Notice Date: March 26, 2003  
Comment Period Ends: April 25, 2003

OEPA Permit No.: 11O00005\*ID  
Application No.: OH0009857

Name and Address of Applicant:

U.S. Department of Energy  
P.O. Box 0066  
Miamisburg, Ohio 45343

Name and Address of Facility Where  
Discharge Occurs:

U.S. Department of Energy - MEMP  
1 Mound Road  
Miamisburg, Ohio 45343  
Montgomery County

Receiving Water: **Great Miami River and  
Mound Overflow Creek**

Subsequent  
Stream Network: **Great Miami River to  
Ohio River**

### Introduction

Development of a Fact Sheet for NPDES permits is mandated by Title 40 of the Code of Federal Regulations, Section 124.8 and 124.56. This document fulfills the requirements established in those regulations by providing the information necessary to inform the public of actions proposed by the Ohio Environmental Protection Agency, as well as the methods by which the public can participate in the process of finalizing those actions.

This Fact Sheet is prepared in order to document the technical basis and risk management decisions that are considered in the determination of water quality based NPDES Permit effluent limitations. The technical basis for the Fact Sheet may consist of evaluations of promulgated effluent guidelines, existing effluent quality, instream biological, chemical and physical conditions, and the relative risk of alternative effluent limitations. This Fact Sheet details the discretionary decision-making process empowered to the Director by the Clean Water Act and Ohio Water Pollution Control Law (ORC 6111). Decisions to award variances to Water Quality Standards or promulgated effluent guidelines for economic or technological reasons will also be justified in the Fact Sheet where necessary.

### Procedures for Participation in the Formulation of Final Determinations

The draft action shall be issued as a final action unless the Director revises the draft after consideration of the record of a public meeting or written comments, or upon disapproval by the Administrator of the U.S. Environmental Protection Agency.

Within thirty days of the date of the Public Notice, any person may request or petition for a public meeting for presentation of evidence, statements or opinions. The purpose of the public meeting is to obtain additional evidence. Statements concerning the issues raised by the party requesting the meeting are invited. Evidence may be presented by the applicant, the state, and other parties, and following presentation of such evidence other interested persons may present testimony of facts or statements of opinion.

Requests for public meetings shall be in writing and shall state the action of the Director objected to, the questions to be considered, and the reasons the action is contested. Such requests should be addressed to:

**Legal Records Section  
Ohio Environmental Protection Agency  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

Interested persons are invited to submit written comments upon the discharge permit. Comments should be submitted in person or by mail no later than 30 days after the date of this Public Notice. Deliver or mail all comments to:

**Ohio Environmental Protection Agency  
Attention: Division of Surface Water  
Permits Section  
P.O. Box 1049  
Columbus, Ohio 43216-1049**

The OEPA permit number and Public Notice numbers should appear on each page of any submitted comments. All comments received no later than 30 days after the date of the Public Notice will be considered.

Citizens may conduct file reviews regarding specific companies or sites. Appointments are necessary to conduct file reviews, because requests to review files have increased dramatically in recent years. The first 250 pages copied are free. For requests to copy more than 250 pages, there is a five-cent charge for each page copied. Payment is required by check or money order, made payable to Treasurer State of Ohio.

### **Location of Discharge/Receiving Water Use Classification**

U.S. Department of Energy discharges to the Great Miami River at River Mile (RM) 65.90 (outfall 001) and to Mound Overflow Creek at RM 0.86 (outfall 002). The approximate location of the facility is shown in Figure 1.

Mound Overflow Creek is described by Ohio EPA River Code: 14-, USEPA River Reach #: 05080002-NA, County: Montgomery, Ecoregion: Eastern Corn Belt Plains. Mound Overflow Creek is presently designated for the following uses: Modified Warmwater Habitat (MWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS) and Secondary Contact Recreation (SCR).

This segment of the Great Miami River is described by Ohio EPA River Code: 14-001, USEPA River Reach #: 05080002-004, County: Montgomery, Ecoregion: Eastern Corn Belt Plains. The Great Miami River is presently designated for the following uses: Warmwater Habitat (WWH), Agricultural Water Supply (AWS), Industrial Water Supply (IWS) and Primary Contact Recreation (PCR). The Lower Great Miami River study area is shown in Figure 2.

### **Facility Description**

The Miamisburg Environmental Management Project (MEMP) is a former DOE Mound Facility nuclear weapon component manufacturing site. The site is currently being transformed to a private industrial research park. Current DOE operations include building heat sources for space applications, environmental restoration, and building demolitions. Private enterprises using the facilities at MEMP include chemical/analytical laboratories, dynamic testing laboratories and manufacturing processes, such as pyrotechnics and flexible circuits.

The process operations performed at this facility are classified by the Standard Industrial Classification (SIC) codes 3769, "Space Parts - heat source production", 1629, "Environmental Restoration", and 1795, "Demolition Work - buildings." Discharges from these operations are not covered by any USEPA categorical effluent guidelines..

### **Description of Existing Discharge**

USDOE has reconfigured the sampling stations at MEMP since the last permit was issued. Internal monitoring point 602 has been re-routed to Mound Overflow Creek via outfall 002. The flows to Mound Overflow Creek are proposed to be monitored at outfall 002, and outfall 602 would be removed from the permit. These flows include storm water from the site, oil/water separator discharges from areas where gasoline is stored, water softener backwash, cooling tower blowdown, once-through non-contact cooling water, reverse osmosis reject water, A small flow (approx. 200 gallons per day) from the radioactive wastewater treatment plant, floor drains and HVAC equipment discharges.

Most of the wastewaters are treated by settling in retention ponds prior to discharge. In addition, the radioactive wastewater treatment plant consists of chemical precipitation, flocculation, settling, carbon adsorption, multi-media filtration and neutralization. Sludge is pressure filtered and packaged, and then shipped off-site for burial as radioactive waste.

With the re-routing of outfall 602, the only discharge to outfall 001 is now internal monitoring point 601. This draft permit would redesignate the 601 monitoring point to be outfall 001. As a result, the draft contains only outfalls 001 and 002, and no internal monitoring stations are being required.

The discharge from outfall 601/001 contains primarily sanitary wastewater, with small amounts of boiler blowdown, non-contact cooling water, and wastewaters from laundry, laboratory, photo developing and processing, HVAC equipment, and Superfund-related groundwater discharges. This treatment system consists of grit removal, screening, pre-aeration, activated sludge aeration, sedimentation, slow sand filtration, chlorination and de-chlorination. Sludges from this system are processed by aerobic digestion, belt filtration and landfilling.

The Mound facility also has a third outfall, 003, that is covered under a Superfund discharge authorization, rather than this NPDES permit. This outfall consists of groundwater treated to remove organic pollutants.

Tables 1 and 2 present a summaries of analytical results for outfall 601 and 602 effluent samples compiled from the NPDES application, and from bioassay tests done by Ohio EPA. The monthly average  $PEQ_{avg}$  and daily maximum  $PEQ_{max}$  decision criteria are also included on this table.

Tables 3 and 4 present summaries of unaltered monthly operation report data for the period January 1996 to December 2001 for the USDOE - MEMP as well as current permit limits, and monthly average  $PEQ_{avg}$  and daily maximum  $PEQ_{max}$  values.

Tables 5 and 6 present results from acute and chronic bioassay tests conducted in accordance with the NPDES permit. Pimephales promelas (fathead minnows), and Ceriodaphnia dubia (water flea) were the test organisms.

### **Receiving Water Quality / Environmental Hazard Assessment**

An assessment of the impact of a permitted point source on the immediate receiving waters includes an evaluation of the available chemical/physical (water column, effluents, sediment, flows), biological (fish and macroinvertebrate assemblages), and habitat data which have been collected by Ohio EPA pursuant to the Five-Year Basin Approach for Monitoring and NPDES Reissuance. Other data may be used provided it was collected in accordance with Ohio EPA methods and protocols as specified by the Ohio Water Quality Standards and Ohio EPA guidance documents. Other information which may be evaluated includes, but is not limited to, NPDES permittee self-monitoring data and effluent and mixing zone bioassays conducted by Ohio EPA, the permittee, or U.S. EPA.

Ohio EPA relies on a tiered approach in attempting to link administrative activity indicators (*i.e.*, permitting, grants, enforcement) with true environmental indicators (*i.e.*, stressor, exposure, and response indicators). Stressor indicators generally include activities which have the potential to degrade the aquatic environment such as pollutant discharges (permitted and unpermitted), land use effects, and habitat modifications. Exposure indicators include whole effluent toxicity tests, tissue residues, and biomarkers, each of which provides evidence of biological exposure to stressor or bioaccumulative agents. Response indicators include the more direct measures of community and population response and are represented here by the biological indices which comprise Ohio EPA's biological criteria. The key is in using the different types of indicators within the roles which are the most appropriate for each. Describing the causes and sources associated with observed impairments relies on an interpretation of

multiple lines of evidence including the water chemistry data, sediment data, habitat data, effluent data, biomonitoring results, land use data, and biological response signatures within the biological data itself. Thus the assignment of principal causes and sources of impairment represents the association of impairments (defined by response indicators) with stressor and exposure indicators.

Use attainment is a term which describes the degree to which environmental indicators are either above or below criteria specified by the Ohio Water Quality Standards (WQS; Ohio Administrative Code 3745-1). Assessing use attainment status for aquatic life uses involves a primary reliance on the Ohio EPA biological criteria (OAC 3745-1-07; Table 7-14). These are confined to ambient assessments and apply to rivers and streams outside of mixing zones. Numerical biological criteria are based on multimetric biological indices which include the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), which indicate the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the Macroinvertebrate community. Numerical endpoints are stratified by ecoregion, use designation, and stream or river size. Three attainment status results are possible at each sampling location -full, partial, or non-attainment. Full attainment means that all of the applicable indices meet the biocriteria. Partial attainment means that one or more of the applicable indices meet the biocriteria or one of the organism groups reflects poor or very poor performance. An aquatic life use attainment table (see Table 7) is constructed based on the sampling results and is arranged from upstream to downstream and includes the sampling locations indicated by river mile, the applicable biological indices, the use attainment status (*i.e.*, full, partial, or non), the Qualitative Habitat Evaluation Index (QHEI), and comments and observations for each sampling location.

The WWH use attainment status in the Great Miami River from the city of Dayton to Middletown (RM 90.0 to 55.0) has improved markedly since 1980 and 1989 due to the numerous WWTP upgrades and subsequent reductions in loadings of oxygen demanding wastes and ammonia-N. A total of 29.9 miles were in full attainment, 3.6 miles were in partial attainment, and 1.5 were in non attainment of the WWH criterion in 1995. Within the upper half of the mainstem, all of the free flowing sites were in full attainment of the existing WWH use designation with the exception of one site immediately downstream from Owl Creek. Most of the impounded segments were in partial or non attainment of the WWH use designation with the exception of the DP&L Tait dam pool and the Monument Avenue dam pool. The partial or non attainment corresponded to an increased incidence of deformities, erosions, lesions, and tumor (DELT) anomalies which occurred within the dam pools indicating sublethal stresses to the fish community. The sublethal stresses were principally nutrient enrichment and marginal dissolved oxygen (D.O.) levels, which are associated with the many WWTPs and other discharges of organic wastes. The WWTP upgrades have substantially advanced aquatic life use attainment within the free flowing sections of the middle Great Miami River.

Fish community performance met or exceeded the applicable Index of Biotic Integrity (IBI) and Modified Index of Well-Being (MIwb) criteria at 54% and 87%, respectively, of the mainstem sites and 73% and 53%, respectively, of the tributary locations sampled. Fish assemblages were indicative of exceptional to fair quality in the mainstem from Dayton to the mouth (RM 90.0 to 0.0) (excluding mixing zones and impoundments). Impounded segments in the mainstem performed mostly in the fair range.

Macroinvertebrate community performance met or exceeded the applicable Invertebrate Community Index (ICI) criterion at 100% of the sites sampled on the Great Miami River (excluding mixing zones and impoundments), and 40% of the tributary locations. ICI scores and qualitative evaluations were indicative of exceptional to good quality at all of the mainstem sites

### ***U.S. DOE Mound***

The U.S. DOE Mound Lab manufactured components for the nuclear weapons program, stable isotopes, and conducted research for other Department of Energy programs. Industrial and sanitary wastewaters were and still are generated by this facility. The treatment process for sanitary wastewater (outfall 001) consists of bar screening, fine screening, grit removal, aeration, settling, tertiary filtration, chlorination and dechlorination. Outfall 002 is comprised of wastewater from the radioactive waste disposal building (treatment consists of pH adjustment, clarification, carbon addition, sand filtration, bone char column and 1 micron filtration), non-contact cooling water, boiler blowdown, softener backwash, and storm water runoff treated in retention basins. The design capacity of the sanitary treatment plant is 0.120 MGD. Improvements made to the sanitary waste disposal plant include a new bar screen, grit removal, and the addition of a circular clarifier which replaced the existing clarifiers.

The U.S. DOE Mound facility has three wastewater discharge locations. Outfall 001 discharges sanitary wastewater directly to the Great Miami River at RM 65.9 and outfall 002 and 003 discharges to the Miami-Erie Canal. The Mound Overflow Creek is a small headwater stream (approximately 0.4 miles long) which provides a conveyance for overflow water from the Miami-Erie Canal to the Great Miami River at RM 65.08. The stream flow in the Mound Overflow Creek is comprised partly of effluent from the Mound 002 outfall and 003 outfall which discharges from a pump and treat groundwater remediation.

The partial attainment of the WWH use in the segment that Mound outfall 001 discharges to is primarily caused by the altered dam pool habitat. The Mound 001 outfall has shown periodic acute toxicity, and copper concentrations that may be toxic.

### **Development of Water-Quality-Based Effluent Limits**

Determining appropriate effluent concentrations is a multiple-step process in which parameters are identified as likely to be discharged by a facility, evaluated with respect to Ohio water quality criteria, and examined to determine the likelihood that the existing effluent could violate the calculated limits.

The assimilative capacity was divided among several facilities in order to account for possible interactivity of the discharges. The CONSWLA model was used to distribute the loads of those conservative parameters requiring allocation. The study area is depicted in Figure 1.

### **Parameter Selection**

Effluent data for Mound were used to determine what parameters should undergo wasteload allocation. The sources of effluent data are as follows:

Self-monitoring data (LEAPS)	January 1996 through June 2001
Form 2.c. Application Data	2002
Ohio EPA data (compliance, survey)	2000

The effluent data were checked for outliers and no values were removed. The average and maximum projected effluent quality (PEQ) values are presented in Table 8. For a summary of the screening results, refer to the parameter groupings at the end of this section.

### Wasteload Allocation

For those parameters that require a wasteload allocation (WLA), the results are based on the uses assigned to the receiving waterbody in OAC 3745-1. The applicable waterbody uses for this facility's discharge and the associated stream design flows are as follows:

Aquatic life (WWH)	Average	Annual 7Q10
Toxics (metals, organics, etc.)	Maximum	Annual 1Q10
Ammonia-N	Average	Summer/winter 30Q10
Agricultural Water Supply		Harmonic mean flow
Human Health (nondrinking)		Harmonic mean flow

Allocations are developed using a percentage of stream design flow (as specified in Table 10), and allocations cannot exceed the Inside Mixing Zone Maximum criteria.

The data used in the WLA are listed in Tables 9 and 10. The wasteload allocation results to maintain all applicable criteria are presented in Tables 11-13. The current permit limits for  $\text{NH}_3\text{-N}$  were evaluated and are adequate to maintain the WQS for  $\text{NH}_3\text{-N}$ . Therefore,  $\text{NH}_3\text{-N}$  will not be addressed further in this report.

### Reasonable Potential

The preliminary effluent limits are the lowest average WLA (average PEL) and the maximum WLA (maximum PEL). To determine the reasonable potential of the discharger to exceed the WLA for each parameter, the facility's effluent quality is compared to the preliminary effluent limits. The average PEQ value (Table 8) is compared to the average PEL, and the maximum PEQ value is compared to the maximum PEL. Based on the calculated percentage of the respective average and maximum comparisons, the parameters are assigned to "groups", as listed in Tables 14-16.

### Whole Effluent Toxicity

Whole effluent toxicity or "WET" is the total toxic effect of an effluent on aquatic life measured directly with a toxicity test. Acute WET measures short term effects of the effluent while chronic WET measures longer term and potentially more subtle effects of the effluent. The allowable effluent toxicity (AET) is a factor considered in evaluating whole effluent toxicity. The AET calculations are similar to those for aquatic life criteria (using the chronic toxicity unit ( $\text{TU}_c$ ) and 7Q10 for average and the acute toxicity unit ( $\text{TU}_a$ ) and 1Q10 for maximum). For USDOE Mound, the AET values are; for outfall 001, 1.0  $\text{TU}_a$  and 3926.  $\text{TU}_c$ ; for outfall 002, 0.3  $\text{TU}_a$  and 1.0  $\text{TU}_c$ ; and for outfall 003, 0.3  $\text{TU}_a$  and 4.06  $\text{TU}_c$ .

The chronic toxicity unit (TU<sub>c</sub>) is defined as 100 divided by the IC<sub>25</sub>:

$$TU_c = \frac{100}{IC_{25}}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations except when the following equation is more restrictive (*Ceriodaphnia dubia* only):

$$TU_c = \frac{100}{\text{geometric mean of NOEC and LOEC}}$$

The acute toxicity unit (TU<sub>a</sub>) is defined as 100 divided by the LC50 for the most sensitive test species:

$$TU_a = \frac{100}{LC50}$$

This equation applies outside the mixing zone for warmwater, modified warmwater, exceptional warmwater, coldwater, and seasonal salmonid use designations. When the calculated AET is less than 1.0 TU<sub>a</sub>, Allowable Effluent Toxicity is defined as:

<u>Dilution Ratio</u> <u>(downstream flow to discharger flow)</u>	<u>Allowable Effluent Toxicity</u> <u>(percent effects in 100% effluent)</u>
up to 2 to 1	30
greater than 2 to 1 but less than 2.7 to 1	40
2.7 to 1 to 3.3 to 1	50

The AET is 30% mortality in 100% effluent based on the dilution ratio of 1 to 1.

#### **Effluent Limits/Hazard Management Decisions**

The listings in Tables 14-16 reflect the hazard assessment done according to WLA procedures. Tables 17 and 18 show the draft NPDES limits for U.S. DOE - Mound.

#### **Outfall 001**

Limits proposed for pH and fecal coliform are based on Water Quality Standards (OAC 3745-1).

Proposed limits for total suspended solids (TSS) and 5-day carbonaceous biochemical oxygen demand (CBOD<sub>5</sub>) are based on the existing permit concentration limits. The loading limits for these parameters have been reduced due to the removal of outfall 602 wastewaters from this discharge. Monitoring of ammonia-nitrogen at sewage treatment plants is appropriate and is proposed.

Phosphorus and nitrate/nitrite-nitrogen monitoring are proposed for all wastewater treatment plants discharging to this segment of the Great Miami River because of enrichment impacts in downstream segments. Also, in this segment, dissolved oxygen concentrations are marginal, and the stream does not attain WWH biological standards. Monitoring nutrient inputs is an important factor in understanding the D.O. patterns in impounded streams.

The Ohio EPA risk assessment (Table 14) places chlorine, copper and lead in group 5. This placement as well as the data in Tables 1, 3 and 8 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. Limits for chlorine and lead are based directly on the wasteload allocation. The copper limit is an adjusted WLA. Loading has been shifted from outfall 003 to outfall 001 to increase the outfall 001 wasteload allocation to the inside-mixing-zone maximum (IMZM) water quality standard. The IMZM is a standard designed to protect against rapidly lethal conditions near the point of discharge. The shifting of load from outfall 003 to outfall 001 does not change the reasonable potential determination (Group 3) for outfall 003.

Ohio EPA risk assessment (Table 14) places dissolved solids and cadmium in group 4. This placement as well as the data in Tables 1, 3 and 8 support that these parameters should not pose an environmental hazard and limits are not necessary to protect water quality. Monitoring for group 4 parameters is required by OAC Rule 3745-33-07(A)(2).

The remaining parameters are in groups 2/3 of the risk assessment. Of these parameters the draft permit includes monitoring requirements for zinc and the volatile organic compounds (VOCs). Zinc is present in this outfall and is a pollutant allocated to nearly all of the dischargers in this segment. Monitoring is being continued to track zinc concentrations for the wasteload allocation. VOC monitoring is being continued if the pollutants in the groundwater cleanup are being discharged to outfall 001.

Two of the currently-monitored pollutants at outfall 601 are proposed to be removed from this version of the permit: chromium, mercury and nickel. Chromium and nickel have been detected at low concentrations relative to the wasteload allocation, and mercury was not detected.

#### *Outfall 002*

The proposed limits for suspended solids are a continuation of the current permit conditions, which are based on the ability of the plant's impoundments to settle TSS. The maximum limit may be exceeded as long as under significant rainfall conditions if the average limit is maintained.

Limits proposed for pH and fecal coliform are based on Water Quality Standards (OAC 3745-1).

The Ohio EPA risk assessment (Table 15) places copper in group 5. This placement as well as the data in Tables 2, 3 and 8 indicate that the reasonable potential to exceed WQS exists and limits are necessary to protect water quality. Limits are based on the wasteload allocation.

The Ohio EPA risk assessment (Table 15) places dissolved solids, molybdenum, selenium and zinc in group 5 which recommends limits to protect water quality. Because of the few detections and data points for these parameters, Ohio EPA is using its discretion under OAC Rule 3745-33-07(A)(5) to include monitoring instead of limits to collect additional data for reasonable potential determinations.

Ohio EPA risk assessment (Table 15) places strontium in group 4. This placement as well as the data in Tables 2, 3 and 8 support that these parameters should not pose an environmental hazard and limits are not necessary to protect water quality. Monitoring for group 4 parameters is required by OAC Rule 3745-33-07(A)(2).

Additional monitoring requirements proposed at the final effluent, influent, upstream/downstream and sludge stations are included for all facilities in Ohio and vary according to the type and size of the discharge. In addition to permit compliance, this data is used to assist in the evaluation of effluent quality and treatment plant performance and for designing plant improvements and conducting future stream studies.

#### Carcinogen Additivity Reasonable Potential

The WLA for the USDOE outfall 002 contains an additivity factor equation. Additivity is the combined toxic effect of carcinogenic pollutants. This section evaluates each quotient in the additivity factor equation to determine whether an additivity factor equation is necessary in the permit to limit the total carcinogen risk to  $1 \times 10^{-5}$  (1 in 100,000) or whether additivity is insignificant or "de minimis".

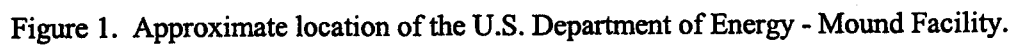
The equation for outfall 002 regulates alpha-BHC and hexachlorobenzene. Comparing the PEQaverage values to the human health WLA: (0.064/24 for a-BHC, and 0.018/0.2 for HCB) shows that the sum of these fractions will be less than 1.0. In this case there is no reasonable potential for the carcinogen risk to exceed 1 in 100,000, and the additivity equation is not needed for this discharge.

#### Whole Effluent Toxicity Reasonable Potential

WET values are compared to a calculated allowable effluent toxicity "AET" value. This comparison along with an assessment of the instream community are two ways in which whole effluent toxicity is evaluated. For USDOE Mound, the AET values are; for outfall 001, 1.0 TU<sub>a</sub> and 3926. TU<sub>c</sub>; for outfall 002, 0.3 TU<sub>a</sub> and 1.0 TU<sub>c</sub>; and for outfall 003, 0.3 TU<sub>a</sub> and 4.06 TU<sub>c</sub>.

Outfall 001 was acutely toxic in one of four samplings, and was not chronically toxic in two samplings. Ohio EPA is placing this outfall in hazard category 3 of the reasonable potential procedures (OAC 3745-33-07(B)). The percentage of toxic tests (25%), the maximum exceedance of AET, the periodic exceedances of inside-mixing-zone maximum standards for copper and chlorine, and the slight impairment of the receiving water all indicate that further testing of this outfall should be done. The frequency of testing is modified by the average exceedance and mixing zone toxicity results, which were both low. The draft permit contains an annual acute toxicity test requirement using *Ceriodaphnia*. The existing results indicate that *Ceriodaphnia* is the more sensitive organism to the 001 discharge.

Outfall 002 has exhibited acute toxicity in both of the tests that have been conducted. The effluent metrics all fall into either hazard category 1, which normally indicates that limits are needed. The ambient stream metrics, near-field mortality and use impairment, showed no toxicity and only slight impairment, respectively. Based on this, we are placing the 002 discharge in hazard category 2, requiring quarterly acute and chronic testing along with a plant performance evaluation to determine if there are any easily-determined causes of the effluent toxicity.



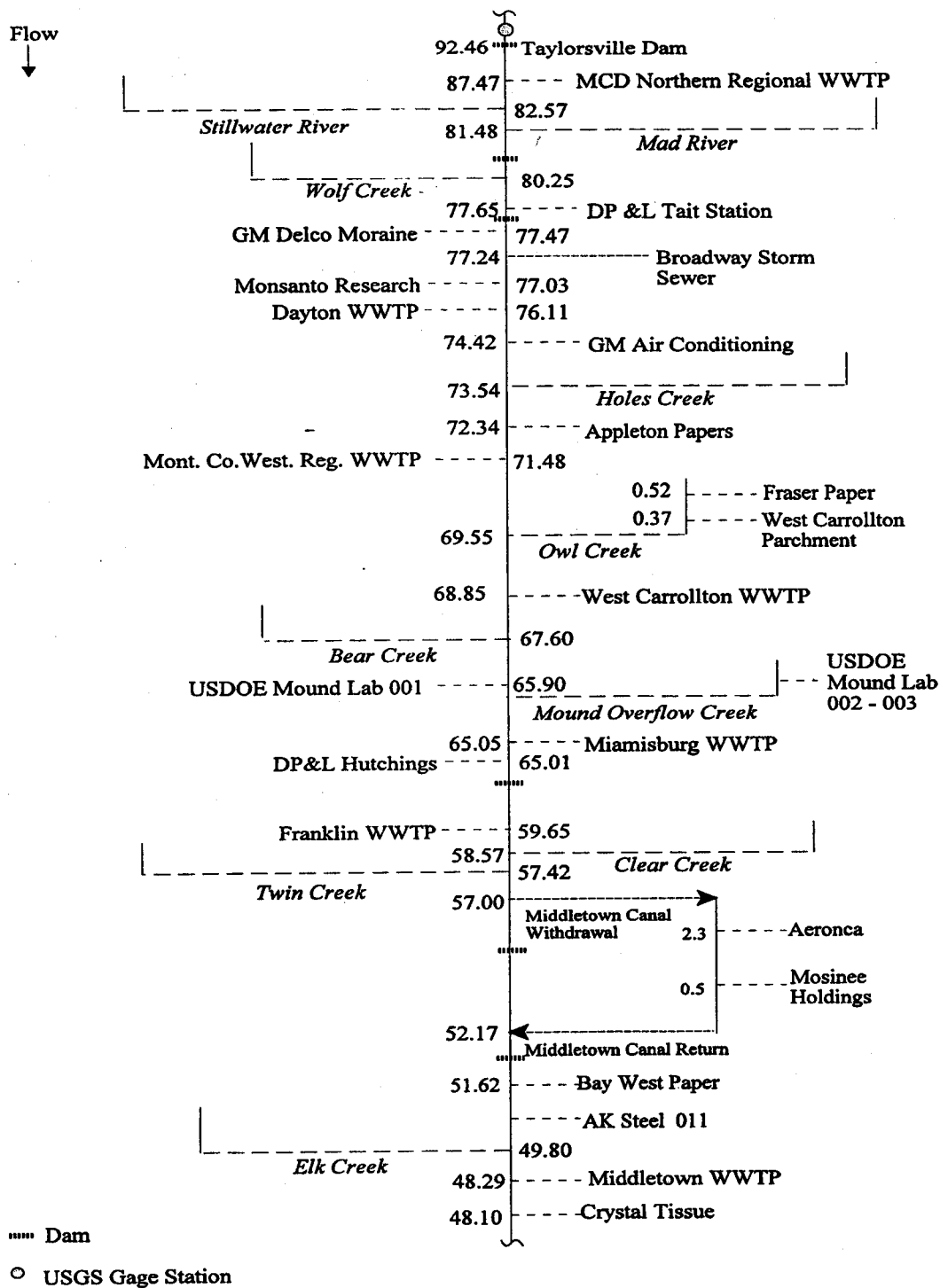


Figure 2. Great Miami River Study Area.

Table 1. Effluent Characterization and Decision Criteria

Summary of analytical results for U.S. DOE-Mound outfall 11000005601. All values are in  $\mu\text{g/l}$  unless otherwise indicated. 2C = Data from application form 2C; OEPA = data from analyses by Ohio EPA; ND = below detection (detection limit); NA = not analyzed. Decision Criteria:  $\text{PEQ}_{\text{avg}}$  = monthly averages;  $\text{PEQ}_{\text{max}}$  = daily maximum analytical results.

PARAMETER		OEPA	OEPA	USDOE Application Form 2C			DECISION CRITERIA	
		06/14/00	09/13/00	n	mean	max	$\text{PEQ}_{\text{avg}}$	$\text{PEQ}_{\text{max}}$
CBOD5	mg/l	<2.0	<2.0	104	0.7	10		
COD	mg/l	12	15	105	10	48		
TDS	mg/l	772	740	NA	NA	NA	2142	2934
TSS	mg/l	<5	<5	104	1.7	12		
Ammonia-N	mg/l	<0.05	0.106	26	<0.30	0.52	0.147	0.239
NO3/NO2-N	mg/l	17.8	18.2	2	11.6	13.7	34.54	47.32
TKN	mg/l	0.89	0.89	2	1.05	1.06		
Phosphorus	mg/l	2.87	2.47	2	1.20	1.99	5.45	7.46
Fluoride	mg/l	NA	NA	1	-	0.22	996	1364
Chlorine	mg/l	NA	NA	103	<0.01	0.05	0.024	0.043
Hardness	mg/l	165	172	NA	NA	NA		
Barium		<15	<15	2	15	15	28	39
Boron		NA	NA	2	191	256	710	973
Cadmium		<0.2	0.3	12	<1	<1	6.6	9.0
Copper		60	66	26	36	83	260	397
Iron		<50	92	2	<100	<100	190	260
Lead		<2.0	<2.0	12	<1	2	49	67
Molybdenum		NA	NA	2	23	24	67	91
Nickel		<40	<40	12	2	9	34	52
Potassium		10000	10000	NA	NA	NA	27740	38000
Strontium		207	204	NA	NA	NA	574	787
Zinc		47	189	12	10.4	67	72	108
Bromoform		<0.5	<0.5	6	0.6	3.7	5.1	7.0
Dibromochloromethane		3.53	1.14	6	0.8	4.7	6.5	8.9
Bromodichloromethane		8.61	4.13	6	1.5	7.4	11.9	16.4
Chloroform		14.1	8.49	6	2.3	7.6	31	48
delta-BHC		0.014	NA	1	-	<0.20	0.064	0.087

Table 2. Effluent Characterization and Decision Criteria

Summary of analytical results for U.S. DOE-Mound outfall 11000005602. All values are in µg/l unless otherwise indicated. 2C = Data from application form 2C; OEPA = data from analyses by Ohio EPA; ND = below detection (detection limit); NA = not analyzed. Decision Criteria: PEQ<sub>avg</sub> = monthly averages; PEQ<sub>max</sub> = daily maximum analytical results.

PARAMETER		OEPA	OEPA	USDOE Application Form 2C			DECISION CRITERIA	
		06/14/00	09/13/00	n	mean	max	PEQ <sub>avg</sub>	PEQ <sub>max</sub>
CBOD5	mg/l	6.7	<2.0	2	<7.5	15		
COD	mg/l	26	<10	2	<7	14		
TDS	mg/l	1410	838	NA	NA	NA	3911	5358
TSS	mg/l	<5	<5	51	15.4	117		
Ammonia-N	mg/l	0.167	0.05	2	<0.3	0.38	0.721	0.988
NO3/NO2-N	mg/l	2.88	1.89	2	0.54	0.57	5.47	7.49
TKN	mg/l	0.74	0.3	2	<0.40	0.76		
Phosphorus	mg/l	0.21	0.15	2	<0.1	<0.1	0.399	0.546
Fluoride	mg/l	NA	NA	2	0.22	0.24	666	912
Hardness	mg/l	271	65.5	NA	NA	NA		
Aluminum		<200	<200	2	113	148	380	520
Barium		64	<15	2	62	93	177	242
Boron		NA	NA	2	110	112	311	426
Cadmium		0.2	<0.2	2	<1	<1	0.56	0.76
Copper		77	149	2	<15	16	283	387
Iron		285	119	2	320	330	626	858
Manganese		25	<10	1	-	20	55	75
Molybdenum		NA	NA	1	-	687	3109	4259
Potassium		4000	<2000	NA	NA	NA	11096	15200
Selenium		3	<2	2	<5	<5	9.5	11.4
Strontium		436	95	NA	NA	NA	1209	1657
Zinc		173	53	2	<50	<50	328	450
Phenolics, tot.		10.1	<10	2	<100	<100	28	38
alpha-BHC		0.014	NA	2	<0.20	<0.20	0.064	0.087
Hexachlorobenzene		0.0039	<2.0	2	<5	<5	0.018	0.024

Table 3. Effluent Characterization and Decision Criteria

Summary of current permit limits and unaltered monthly operating report (MOR) data for USDOE-MEMP outfall 11000005601 and 11000005602. All values are based on annual records unless otherwise indicated. N = Number of Analyses. \* = For pH, 5th percentile shown in place of 50th percentile; \*\* = For dissolved oxygen, 5th percentile shown in place of 95th percentile; A = 7 day average. Decision Criteria:  $PEQ_{avg}$  = monthly average;  $PEQ_{max}$  = daily maximum analytical results.

USDOE - MOUND FACILITY (11000005)

OUTFALL=601

PARAMETER	SEASON	UNITS	CURRENT PERMIT		PERIOD = JAN96 THRU JUN01				DECISION CRITERIA		
			30 DAY	DAILY	N	50 PCTL	95 PCTL	RANGE	N	$PEQ_{avg}$	$PEQ_{max}$
ACETONE	ANNUAL	UG/L	Monitor		24	0	0	0-0			
AMMONIA NH3-N	MAY-OCT	MG/L	Monitor		69	0	0.13	0-0.37	44	0.147	0.239
		KG/DAY	--	--	69	0	0.03883	0-0.112			
	NOV-APR	MG/L	Monitor		69	0	1.22	0-6.8	35	3.06	3.27
		KG/DAY	--	--	69	0	0.21953	0-1.8017			
CADMIUM TOT REC	ANNUAL	UG/L	Monitor		64	0	0	0-10	101	6.6	9.0
		KG/DAY	--	--	64	0	0	0-0.0026			
CADMIUM TREC 0.001	ANNUAL	UG/L	Monitor		37	0	0	0-0	101	6.6	9.0
CARBNTETTRACHLOR	ANNUAL	UG/L	Monitor		24	0	0	0-0			
CBOD 5 DAY	MAY-OCT	MG/L	10	15	281	0	8	0-25			
		KG/DAY	4.5	6.8	281	0	1.0976	0-3.785			
	NOV-APR	MG/L	10	15	282	0	8	0-88			
		KG/DAY	4.5	6.8	282	0	1.31718	0-16.654			
CHLORINE TOT RESD	ANNUAL	MG/L	Monitor		563	0	0.04	0-0.6	563	0.024	0.043
		KG/DAY	--	--	563	0	0	0-0.0977			
CHLRFORM	ANNUAL	UG/L	Monitor		24	1.7	13	0-48	24	31	48
		KG/DAY	--	--	24	0.00031	0.00547	0-0.0091			
CHROMIUM TOT REC	ANNUAL	UG/L	Monitor		101	0	19	0-50	101	20	26
		KG/DAY	--	--	101	0	0.00411	0-0.0098			
FEC COLI MFM-FCBR	ANNUAL	/100ML	1000	2000	141	1	50	0-1600			
CONDUIT FLOW	ANNUAL	MGD	Monitor		1977	0.045	0.097	0.01-0.225			
COPPER TOT REC	ANNUAL	UG/L	Monitor		69	118	402	26-641	116	260	397
		KG/DAY	--	--	69	0.02017	0.05587	0-0.071			
COPPER TREC 0.001	ANNUAL	UG/L	Monitor		47	32	88	0-119	116	260	397
		KG/DAY	--	--	47	0.00522	0.01579	0-0.0268			
TRAN-1,2DICHLORE	ANNUAL	UG/L	Monitor		24	0	0	0-0			
LEAD TOT REC	ANNUAL	UG/L	Monitor		64	0	47	0-91	101	49	67
		KG/DAY	--	--	64	0	0.00931	0-0.0193			
LEAD TREC 0.001	ANNUAL	UG/L	Monitor		37	0	3	0-20	101	49	67
		KG/DAY	--	--	37	0	0.00109	0-0.0018			

USDOE - MOUND FACILITY (11000005)

OUTFALL=601

PARAMETER	SEASON	UNITS	CURRENT PERMIT		PERIOD = JAN96 THRU JUN01			RANGE	DECISION CRITERIA		
			30 DAY	DAILY	N	50 PCTL	95 PCTL		N	PEQavg	PEQmax
MERCURY HG,TOT	ANNUAL	UG/L	--	--	3	0	0	0-0			
METHYLENCHLORIDE	ANNUAL	UG/L		Monitor	24	0	0	0-0			
MTHLETHLKETONE	ANNUAL	UG/L		Monitor	24	0	0	0-0			
NICKEL TOT REC	ANNUAL	UG/L		Monitor	64	15	48	0-62	101	34	53
		KG/DAY	--	--	64	0.00252	0.00727	0-0.0109			
NICKEL TREC 0.01,	ANNUAL	UG/L		Monitor	37	0	16	0-33	101	34	53
		KG/DAY	--	--	37	0	0.00327	0-0.005			
OIL GRSE TOT	ANNUAL	MG/L		Monitor	23	0	2	0-7			
		KG/DAY	--	--	23	0	0	0-0.3785			
PH	ANNUAL	S.U.	6.5 to 9.0		1158	7.1*	8.4	5.6-9.2			
RESIDUE TOT NFLT	ANNUAL	MG/L	15	30	563	1.5	7	0-19			
		KG/DAY	6.8	13.6	563	0.23164	1.3626	0-3.3724			
TETRACHLOROETHYL	ANNUAL	UG/L		Monitor	24	0	0	0-0			
1122TETRCHLORET	ANNUAL	UG/L		Monitor	24	0	0	0-0			
111TRICHLOROETHA	ANNUAL	UG/L		Monitor	24	0	0	0-0			
VINYLCHLORIDE	ANNUAL	UG/L		Monitor	24	0	0	0-0			
ZINC TOT REC	ANNUAL	UG/L		Monitor	101	32	80	0-169	101	72	108
		KG/DAY	--	--	101	0.00602	0.01635	0-0.0333			

USDOE - MOUND FACILITY (11000005)

OUTFALL=602

PARAMETER	SEASON	UNITS	CURRENT PERMIT		PERIOD = JAN96 THRU JUN01			RANGE
			30 DAY	DAILY	N	50 PCTL	95 PCTL	
COD	ANNUAL	MG/L		Monitor	279	61	508	0-1650
		KG/DAY	--	--	279	20.439	191.41	0-763.32
CONDUIT FLOW	ANNUAL	MGD		Monitor	1936	0.088	0.275	0-0.565
OIL GRSE TOT	ANNUAL	MG/L	--	10	67	0	6	0-405
		KG/DAY	--	14.8	67	0	2.1574	0-29.126
PH	ANNUAL	S.U.	6.5 to 9.0		281	7.7*	8.7	7.1-8.9
RESIDUE TOT NFLT	ANNUAL	MG/L	30	45*	275	4	29	0-93
		KG/DAY	44.3	66.4	275	0.9084	11.658	0-54.561

\* - This limit shall not apply during an OEPA week in which rain equal to or greater than 1/2 inch occurs within 24-hours or in which rain equal to or greater than 1/4 inch per day occurs for two or more days.

Table 4. Effluent Characterization and Decision Criteria

Summary of current permit limits and unaltered monthly operating report (MOR) data for USDOE-MEMP outfall 11000005001 and 11000005002. All values are based on annual records unless otherwise indicated. N = Number of Analyses. \* = For pH, 5th percentile shown in place of 50th percentile; \*\* = For dissolved oxygen, 5th percentile shown in place of 95th percentile; A = 7 day average. Decision Criteria:  $PEQ_{avg}$  = monthly average;  $PEQ_{max}$  = daily maximum analytical results.

USDOE - MOUND FACILITY (11000005)    OUTFALL=001

PARAMETER	SEASON	UNITS	CURRENT PERMIT		PERIOD = JAN96 THRU JUN01			
			30 DAY	DAILY	N	50 PCTL	95 PCTL	RANGE
BIS(2-ETHYLHEXL)	ANNUAL	UG/L	--	--	21	0	5.8	0-29
		KG/DAY	--	--	21	0	0.00329	0-0.0165
CADMIUM TOT REC	ANNUAL	UG/L	Monitor		94	0	0	0-17
		KG/DAY	--	--	94	0	0	0-0.0155
CADMIUM TREC 0.001	ANNUAL	UG/L	Monitor		42	0	0	0-26
		KG/DAY	--	--	42	0	0	0-0.0157
CHLORINE TOT RESD	ANNUAL	MG/L	--	--	57	0	0	0-0.22
		KG/DAY	--	--	57	0	0	0-0.0637
CHROMIUM TOT REC	ANNUAL	UG/L	Monitor		137	0	0	0-55
		KG/DAY	--	--	137	0	0	0-0.0348
CONDUIT FLOW	ANNUAL	MGD	Monitor		2007	0.134	0.33	0.013-0.72
COPPER TOT REC	ANNUAL	UG/L	--	120	95	61	165	7-264
		KG/DAY	--	0.213	95	0.04179	0.10102	0.0037-0.1799
COPPER TREC 0.001	ANNUAL	UG/L	--	120	42	39	87.3	0-98
		KG/DAY	--	0.213	42	0.01502	0.05757	0-0.058
CYANIDE FREE	ANNUAL	MG/L	Monitor		65	0	0	0-0
LEAD TOT REC	ANNUAL	UG/L	Monitor		94	0	29	0-44
		KG/DAY	--	--	94	0	0.01647	0-0.0203
LEAD TREC 0.001	ANNUAL	UG/L	Monitor		42	0	21	0-140
		KG/DAY	--	--	42	0	0.01008	0-0.0519
NICKEL TOT REC	ANNUAL	UG/L	Monitor		94	26	60	0-130
		KG/DAY	--	--	94	0.01476	0.0528	0-0.1186
NICKEL TREC 0.01	ANNUAL	UG/L	Monitor		42	0	58	0-173
		KG/DAY	--	--	42	0	0.03043	0-0.1048
PCP TOT	ANNUAL	UG/L	--	--	21	0	0	0-0
PH	ANNUAL	S.U.	6.5 to 9.0		167	7.3*	8.6	7.13-8.8
ZINC TOT REC	ANNUAL	UG/L	Monitor		145	27	90	0-314
		KG/DAY	--	--	145	0.0159	0.07184	0-0.2258

USDOE - MOUND FACILITY (11000005) OUTFALL=002

PARAMETER	SEASON	UNITS	CURRENT PERMIT		PERIOD = JAN96 THRU JUN01			RANGE
			30 DAY	DAILY	N	50 PCTL	95 PCTL	
CONDUIT FLOW	ANNUAL	MGD	Monitor		1970	0.248	1.29	0.016-3.92
PH	ANNUAL	S.U.	6.5 to 9.0		282	7.31*	8.7	7-9
RESIDUE TOT NFLT	ANNUAL	MG/L	30	45*	280	10.9	37	0-117
		KG/DAY	--	--	280	9.9924	136.71	0-850.26

\* - This limit shall not apply during an OEPA week in which rain equal to or greater than 1/4 inch occurs within 24-hours or in which rain equal to or greater than 1/4 inch per day occurs for two or more days.

Table 5. Summary of ACUTE toxicity test results on the USDOE Mound effluent from outfalls 1IO00005001 and 1IO00005601.

TEST DATE(a)	<i>Ceriodaphnia dubia</i> 48 hour						<i>Fathead Minnows</i> 48 hour					
	UP <sup>b</sup>	C <sup>c</sup>	LC <sub>50</sub> <sup>d</sup>	%M <sup>e</sup>	TUa <sup>f</sup>	NF <sup>g</sup>	UP <sup>b</sup>	C <sup>c</sup>	LC <sub>50</sub> <sup>d</sup>	%M <sup>e</sup>	TUa <sup>f</sup>	NF <sup>g</sup>
<i>Outfall 601</i>												
06/14/2000 (O)	0	0	<100	80-95	>1.0	0	0	0	>100	0	<1.0	0
09/12/2000 (O)	0	5	>100	0-10	<1.0	0	5	0	>100	0-5	<1.0	5
04/12/2001 (E)	NT	0	>100	0	<1.0	NT	NT	0	>100	0	<1.0	NT
06/12/2001 (E)	NT	0	>100	0	<1.0	NT	NT	0	>100	0	<1.0	NT
<i>Outfall 602</i>												
06/14/2000 (O)	0	0	<100	65	>1.0	0	0	0	>100	0	<1.0	0
09/12/2000 (O)	0	5	70.7	50-100	1.4	0	5	0	>100	0-25	<1.0	5

<sup>a</sup> O = EPA test; E = entity test

<sup>b</sup> UP = upstream control water

<sup>c</sup> C = laboratory water control

<sup>d</sup> LC<sub>50</sub> = Median Lethal Concentration

<sup>e</sup> EC<sub>50</sub> = Median effects concentration

NT = not tested

<sup>f</sup> %A = Percent Adversely Affected in 100% effluent

<sup>g</sup> TUa = Acute Toxicity Units

<sup>h</sup> NF = Near Field Sample in the Great Miami River

<sup>i</sup> %M = Percent Mortality in 100% effluent

ND = not determined

Table 6. Summary of CHRONIC toxicity test results on the USDOE Mound effluent from outfall 11000005601.

Test Date (a)	Ceriodaphnia dubia 7-Day										Fathead Minnows 7-Day					
	UP <sup>b</sup>	C <sup>c</sup>	IC <sub>25</sub> <sup>d</sup>	TU <sub>c</sub> <sup>e</sup>	Survival			Reproduction			FF <sup>f</sup>	UP <sup>b</sup>	C <sup>c</sup>	IC <sub>25</sub> <sup>d</sup>	TU <sub>c</sub> <sup>e</sup>	FF <sup>f</sup>
					LOEC <sup>g</sup>	NOEC <sup>h</sup>	TU <sub>c</sub> <sup>h</sup>	LOEC <sup>g</sup>	NOEC <sup>h</sup>	TU <sub>c</sub> <sup>h</sup>						
04/12/2001 (E)	NT <sup>i</sup>	10	>100	<1.0	>100	100	<1.0	>100	100	<1.0	NT	NT	0	>100	<1.0	NT
06/12/2001 (E)	NT	0	>100	<1.0	>100	100	<1.0	>100	100	<1.0	NT	NT	0	>100	<1.0	NT

<sup>a</sup>O = EPA test; E = entity test

<sup>b</sup>UP = upstream control water

<sup>c</sup>C = laboratory water control

<sup>d</sup>IC<sub>25</sub> = inhibition concentration twenty-five

<sup>e</sup>TU<sub>c</sub> = chronic toxicity units based on IC<sub>25</sub>

<sup>f</sup>LOEC = lowest observed effects concentration

<sup>g</sup>NOEC = no observed effects concentration

<sup>h</sup>TU<sub>c</sub> = chronic toxicity units

<sup>i</sup>FF = far-field effect

<sup>j</sup>STU<sub>c</sub> = TU<sub>c</sub> for survival

<sup>k</sup>GTU<sub>c</sub> = TU<sub>c</sub> for growth

NT = not tested

ND = not determined

Table 7. Summary of the aquatic life use attainment status for the Warmwater Habitat use designation in Great Miami River based on data collected by the Ohio EPA in 1995.

RIVER MILE Fish/Macro.	IBI	Mod. Iwb	ICI	QHEI	Use Attain- Ment Status	Comments
<b>Great Miami River (1995)</b>						
<i>Eastern Corn Belt Plains - WWH Use Designation (Existing)</i>						
69.0B/68.8	44	8.9	44	82.5	FULL	dst. W. Carrollton WWTP
--/66.9	--	--	46	--	[FULL]	ust. Mound
65.9B/ --	30*	8.1 <sub>ns</sub>	--	57.0	[PART]	Adj. Mound, imp.
65.0B/ --	34	8.7	--	46.5	NA	M'burg WWTP mix zone, imp.
64.8B/ --	33*	8.3 <sub>ns</sub>	--	46.0	[PART]	dst. M'burg WWTP, imp.
64.3B/64.35	40	8.9	VG, G	60.5	NA	DP&L Hutchings EGS m. zone
--/64.3	--	--	50	--	[FULL]	dst. Hutchings EGS Dam
64.0B/64.1	41 <sub>ns</sub>	9.5	52	85.5	FULL	dst. DP&L Hutchings EGS
<b>Mound Overflow Creek (1995)</b>						
<i>Eastern Corn Belt Plains - MWH Use Designation (Existing)</i>						
0.2H/0.2	34	NA	F*	51.0	PART.	dst. DOE Mound

\* Significant departure from applicable biocriterion (>4 IBI or ICI units, >0.5 MIwb units); poor and very poor results are underlined.

<sub>ns</sub> Nonsignificant departure from biological criterion (<4 IBI, <4 ICI, <0.5 MIwb units). NS/EWH is based on nonsignificant departure from the recommended EWH criteria.

a Narrative evaluation used in lieu of ICI (E=Exceptional; VG= Very Good; G=Good; MG=Marginally good; F=Fair; P=Poor; VP=Very Poor).

b Qualitative Habitat Evaluation Index (QHEI) values based on Rankin (1989).

c Attainment status based on one organism group is parenthetically expressed.

B Fish sampled using the Boat Method.

H Headwater site (drainage area < 20 square miles) fish sampling was conducted using a wadeable method.

W Fish sampled using the Wading Method.

**Ecoregional Biological Criteria: (From OAC 3745-1-07, Table 7-14)**

**E. Corn Belt Plains (ECBP)**

INDEX - Site Type	WWH	EWB	MWH <sub>r</sub>	LRW <sub>g</sub>
IBI - Headwaters	40	50	24/NA	18
IBI - Wading	40	50	24/NA	18
IBI - Boat	42	48	24/30	16
Mod. Iwb - Wading	8.3	9.4	6.2/NA	4.5
Mod. Iwb - Boat	8.5	9.6	5.8/6.6	5.0
ICI	36	46	22/NA	14

<sub>r</sub> MWH (Modified Warmwater Habitat) for channelized habitats/impounded habitats.

<sub>g</sub> Interim Criteria for Limited Resource Water.

Table 8. Effluent Data for the USDOE Mound Facility

Parameter	Units		# of Samples	# > MDL	Average PEQ	Maximum PEQ
<b>Outfall 601 (new 001)</b>						
<u>Self-Monitoring (LEAPS) Data</u>						
Ammonia	mg/l	S	44	18	0.147	0.239
Ammonia	mg/l	W	35	16	3.062	3.271
Cadmium	µg/l		101	1	6.57	9.0
Chromium, tot.	µg/l		101	7	20.203	26.361
Copper	µg/l		116	107	259.92	397.42
Lead	µg/l		101	28	49.259	67.478
Nickel	µg/l		101	49	34.246	52.545
Zinc	µg/l		101	66	72.012	108.05
Selenium	µg/l		109	2	5.256	7.2
Carbon Tetrachloride <sup>A</sup>	µg/l		24	0	--	--
Chloroform <sup>A</sup>	µg/l		24	13	30.787	48.081
Methylene Chloride <sup>A</sup>	µg/l		24	0	--	--
Tetrachloroethylene <sup>A</sup>	µg/l		24	0	--	--
1,1,1-Trichloroethane	µg/l		24	0	--	--
1,1,2,2-Tetrachloroethane <sup>A</sup>	µg/l		24	0	--	--
trans-1,2-Dichloroethylene	µg/l		24	0	--	--
Vinyl Chloride <sup>A</sup>	µg/l		24	0	--	--
Chlorine, tot. res.	µg/l		563	41	24.2	43.2
Mercury	µg/l		3	0	--	--
Acetone	µg/l		24	0	--	--
Methyl Ethyl Ketone	µg/l		24	0	--	--
<u>Ohio EPA and 2.c Application Data</u>						
Total Dissolved Solids	µg/l		2	2	2141528.	2933600.
Nitrite+Nitrate	mg/l		4	4	34.544	47.32
Phosphorus	mg/l		4	4	5.447	7.462
Fluoride	µg/l		1	1	996.	1364.
Barium	µg/l		4	2	28.47	39.0
Boron	µg/l		2	2	710.14	972.8
Iron	µg/l		4	1	189.8	260.
Molybdenum	µg/l		2	2	66.58	91.2
Potassium	µg/l		2	2	27740.	38000.
Strontium	µg/l		2	2	574.22	786.6
Bromoform <sup>A</sup>	µg/l		8	--	5.132	7.03
Dibromochloromethane	µg/l		8	--	6.519	8.93
Bromodichloromethane	µg/l		8	--	11.94	16.36
Delta-BHC	µg/l		2	1	0.064	0.087

<sup>A</sup> Carcinogen

Table 8. Effluent Data for the USDOE Mound Facility- continued.

Parameter	Units	# of Samples	# > MDL	Average PEQ	Maximum PEQ
<b>Outfall 602 (new 002)</b>					
<u>Ohio EPA and 2.c Application Data</u>					
Total Dissolved Solids	µg/l	2	2	3911340.	5358000.
Ammonia	mg/l	4	3	0.721	0.988
Nitrite+Nitrate	mg/l	4	4	5.466	7.488
Phosphorus	mg/l	4	2	0.399	0.546
Fluoride	µg/l	2	2	665.76	912.
Aluminum	µg/l	4	2	379.6	520.
Barium	µg/l	4	3	176.51	241.8
Boron	µg/l	2	2	310.69	425.6
Cadmium	µg/l	4	1	0.555	0.76
Copper	µg/l	4	3	282.8	387.4
Iron	µg/l	4	4	626.34	858.
Manganese	µg/l	3	2	54.75	75.
Molybdenum	µg/l	1	1	3109.4	4259.4
Potassium	µg/l	2	1	11096.	15200.
Selenium	µg/l	4	1	9.49	11.4
Strontium	µg/l	2	2	1209.5	1656.8
Zinc	µg/l	4	2	328.35	449.8
Phenolics, total	µg/l	4	1	28.017	38.38
Alpha-BHC <sup>A</sup>	µg/l	3	1	0.064	0.087
Hexachlorobenzene <sup>A</sup>	µg/l	4	1	0.018	0.024
<b>Outfall 003</b>					
<u>Self-Monitoring (LEAPS) Data</u>					
Chromium, total	µg/l	280	4	18.4	25.2
Copper	µg/l	280	6	13.14	18.
Mercury	µg/l	278	2	0.723	0.99
Nickel	µg/l	176	0	--	--
Lead	µg/l	174	0	--	--
Selenium	µg/l	60	1	91.98	126.
Silver	µg/l	60	0	--	--
Zinc	µg/l	174	2	78.84	108.
Total Dissolved Solids	µg/l	122	--	662260.	907200.
Tetrachloroethylene <sup>A</sup>	µg/l	67	1	0.788	1.08
Bis(2-ethylhexyl)phthalate <sup>A</sup>	µg/l	24	0	--	--
<sup>A</sup> Carcinogen					

Table 9. Water Quality Criteria in the Study Area

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Average			Maximum Aquatic Life	
		Human Health	Agri-culture	Aquatic Life		
Aldrin	µg/l	0.0014	--	--	--	--
Antimony	µg/l	4300.	--	190.	900.	1800.
Arsenic	µg/l	--	100.	150.	340.	680.
Barium	µg/l	--	--	220.	2000.	4000.
Benzene	µg/l	710.	--	160.	700.	1400.
Beryllium	µg/l	280.	100.	71.	610.	1200.
Bis (2-chloroethyl) ether	µg/l	14.	--	--	--	--
Bis (2-ethylhexyl) phthalate	µg/l	59.	--	8.4	1100.	2100.
Boron	µg/l	--	--	950.	8500.	17000.
Bromoform	µg/l	3600.	--	230.	1100.	2200.
Bromomethane (Methyl Bromide)	µg/l	4000.	--	16.	38.	75.
Cadmium	µg/l	--	50.	6.1	17.	34.
Chlorine, total residual	µg/l	--	--	11.	19.	38.
Chlorodibromomethane	µg/l	340.	--	--	--	--
Chloroform	µg/l	4700.	--	140.	1300.	2600.
2-Chlorophenol	µg/l	400.	--	32.	290.	580.
Chromium +6, dissolved	µg/l	--	--	11.	16.	31.
Chromium, total	µg/l	--	100.	220.	4700.	9300.
Cobalt	µg/l	--	--	24.	220.	440.
Copper	µg/l	1300.	500.	25.	42.	84.
Cyanide, free	µg/l	220000.	--	12.	46.	92.
4,4'-DDD	µg/l	0.0084	--	--	--	--
4,4'-DDE	µg/l	0.0059	--	--	--	--
4,4'-DDT	µg/l	0.0059	--	--	--	--
1,4- Dichlorobenzene	µg/l	2600.	--	9.4	57.	110.
Dichlorobromomethane	µg/l	460.	--	--	--	--
2,4-Dichlorophenol	µg/l	790.	--	11.	110.	210.
Dieldrin	µg/l	0.0014	--	0.056	0.24	0.47
Endosulfan	µg/l	240.	--	--	--	--
Endrin	µg/l	0.81	--	0.036	0.086	0.17
Endrin Aldehyde	µg/l	0.81	--	--	--	--
Fluoride	µg/l	--	2000.	--	--	--
Heptachlor	µg/l	0.0021	--	--	--	--
Heptachlor Epoxide	µg/l	0.0011	--	--	--	--
Hexachlorobenzene	µg/l	0.0077	--	--	--	--
alpha-BHC	µg/l	0.13	--	--	--	--

Table 9. Water Quality Criteria in the Study Area -continued.

Parameter	Units	Outside Mixing Zone Criteria				Inside Mixing Zone Maximum
		Human Health	Average		Maximum Aquatic Life	
			Agri- culture	Aquatic Life		
beta-BHC	µg/l	0.46	--	--	--	--
gamma-BHC (Lindane)	µg/l	0.63	--	0.057	0.95	1.9
Iron	µg/l	--	5000.	--	--	--
Lead	µg/l	--	100.	28.	540.	1100.
MBAS	µg/l	--	--	--	500.	--
Mercury	µg/l	0.012	10.	0.91	1.7	3.4
Methylene Chloride	µg/l	16000.	--	1900.	11000.	22000.
Molybdenum	µg/l	--	--	110.	2400.	4700.
Nickel	µg/l	4600.	200.	140.	1300.	2500.
Nitrate+Nitrite	mg/l	--	100	--	--	--
PCBs	µg/l	0.0017	--	--	--	--
Phenol	µg/l	4600000.	--	400.	4700.	9400.
Selenium	µg/l	11000.	50.	5.0	--	--
Silver	µg/l	--	--	1.3	12.	24.
Strontium	µg/l	--	--	770.	6900.	14000.
Tetrachloroethylene	µg/l	89.	--	53.	430.	850.
Thallium	µg/l	6.3	--	17.	79.	160.
Toluene	µg/l	200000.	--	62.	560.	1100.
Total Dissolved Solids	µg/l	--	--	1500000.	--	--
1,1,1-Trichloroethane	µg/l	1030000.	--	76.	690.	1400.
2,4,6-Trichlorophenol	µg/l	65.	--	4.9	39.	79.
Zinc	µg/l	69000.	25000.	320.	320.	640.

Table 10. Instream Conditions and Discharger Flow

Parameter	Units		Value	Basis
<b>Upstream Flow</b>				
<b>GMR at Taylorsville</b>				
7Q10	cfs	summer	52.	USGS gage #03263000, 1921-97 data
		winter	83.	USGS gage #03263000, 1921-97 data
		annual	50.	USGS gage #03263000, 1921-97 data
1Q10	cfs	annual	43.	USGS gage #03263000, 1921-97 data
30Q10	cfs	summer	60.	USGS gage #03263000, 1921-97 data
		winter	116.	USGS gage #03263000, 1921-97 data
Harmonic Mean Flow	cfs	annual	241.	USGS gage #03263000, 1921-97 data
Mixing Assumption (GMR & Tribs.)	%	average	100	Stream-to-discharge ratio
	%	maximum	100	Stream-to-discharge ratio
<b>Stillwater River at Mouth</b>				
7Q10	cfs	summer	16.6	USGS gage #03266000, 1925-97 data
		winter	41.6	USGS gage #03266000, 1925-97 data
		annual	16.6	USGS gage #03266000, 1925-97 data
1Q10	cfs	annual	11.4	USGS gage #03266000, 1925-97 data
30Q10	cfs	summer	22.9	USGS gage #03266000, 1925-97 data
		winter	57.2	USGS gage #03266000, 1925-97 data
Harmonic Mean Flow	cfs	annual	111.3	USGS gage #03266000, 1925-97 data
<b>Mad River at Mouth</b>				
7Q10	cfs	summer	143.8	USGS gage #03270000, 1914-21, 24-97
		winter	182.1	USGS gage #03270000, 1914-21, 24-97
		annual	141.8	USGS gage #03270000, 1914-21, 24-97
1Q10	cfs	annual	134.5	USGS gage #03270000, 1914-21, 24-97
30Q10	cfs	summer	158.3	USGS gage #03270000, 1914-21, 24-97
		winter	212.1	USGS gage #03270000, 1914-21, 24-97
Harmonic Mean Flow	cfs	annual	391.1	USGS gage #03270000, 1914-21, 24-97
<b>Wolf Creek at Mouth</b>				
7Q10	cfs	summer	1.74	USGS gage #03271000, 1938-50, 86-97
		winter	3.38	USGS gage #03271000, 1938-50, 86-97
		annual	1.64	USGS gage #03271000, 1938-50, 86-97
1Q10	cfs	annual	1.33	USGS gage #03271000, 1938-50, 86-97
30Q10	cfs	summer	2.46	USGS gage #03271000, 1938-50, 86-97
		winter	6.35	USGS gage #03271000, 1938-50, 86-97
Harmonic Mean Flow	cfs	annual	12.4	USGS gage #03271000, 1938-50, 86-97

Table 10. Instream Conditions and Discharger Flow - continued.

Parameter	Units		Value	Basis
Twin Creek at Mouth				
7Q10	cfs	summer	5.4	USGS gage #03272000, 1914-23, 27-97
		winter	16.1	USGS gage #03272000, 1914-23, 27-97
		annual	5.4	USGS gage #03272000, 1914-23, 27-97
1Q10	cfs	annual	4.71	USGS gage #03272000, 1914-23, 27-97
30Q10	cfs	summer	7.24	USGS gage #03272000, 1914-23, 27-97
		winter	24.1	USGS gage #03272000, 1914-23, 27-97
Harmonic Mean Flow	cfs	annual	40.5	USGS gage #03272000, 1914-23, 27-97
Four Mile Creek at Mouth				
7Q10	cfs	summer	6.84	USGS gage #03272700, 1970-97 data
		winter	15.5	USGS gage #03272700, 1970-97 data
		annual	6.84	USGS gage #03272700, 1970-97 data
1Q10	cfs	annual	5.92	USGS gage #03272700, 1970-97 data
30Q10	cfs	summer	9.58	USGS gage #03272700, 1970-97 data
		winter	31.9	USGS gage #03272700, 1970-97 data
Harmonic Mean Flow	cfs	annual	50.7	USGS gage #03272700, 1970-97 data
Holes Creek at Mouth				
7Q10	cfs	summer	1.11	USGS gage #03271300, 1959-72 data
		winter	2.55	USGS gage #03271300, 1959-72 data
		annual	1.11	USGS gage #03271300, 1959-72 data
1Q10	cfs	annual	1.11	USGS gage #03271300, 1959-72 data
30Q10	cfs	summer	1.43	USGS gage #03271300, 1959-72 data
		winter	3.5	USGS gage #03271300, 1959-72 data
Harmonic Mean Flow	cfs	annual	8.31	USGS gage #03272000, 1914-23, 27-97
Indian Creek at Mouth				
7Q10	cfs	summer	0.2	USGS gage #03274200, 1961-69 data
		winter	0.5	USGS gage #03274200, 1961-69 data
		annual	0.2	USGS gage #03274200, 1961-69 data
1Q10	cfs	annual	0.2	USGS gage #03274200, 1961-69 data
30Q10	cfs	summer	0.3	USGS gage #03274200, 1961-69 data
		winter	0.8	USGS gage #03274200, 1961-69 data
Harmonic Mean Flow	cfs	annual	1.17	USGS gage #03272800, 1960-72 data

Table 10. Instream Conditions and Discharger Flow - continued.

Parameter	Units		Value	Basis
<b>Clear Creek at Mouth</b>				
7Q10	cfs	summer	0.4	USGS gage #03271700, 1959-69 data
		winter	1.5	USGS gage #03271700, 1959-69 data
		annual	0.4	USGS gage #03271700, 1959-69 data
1Q10	cfs	annual	0.4	USGS gage #03271700, 1959-69 data
30Q10	cfs	summer	0.6	USGS gage #03271700, 1959-69 data
		winter	2.5	USGS gage #03271700, 1959-69 data
Harmonic Mean Flow	cfs	annual	3.0	USGS gage #03272000, 1914-23, 27-97
<b>Elk Creek at Mouth</b>				
7Q10	cfs	summer	0.4	USGS gage #03272200, 1960-67 data
		winter	1.3	USGS gage #03272200, 1960-67 data
		annual	0.4	USGS gage #03272200, 1960-67 data
1Q10	cfs	annual	0.4	USGS gage #03272200, 1960-67 data
30Q10	cfs	summer	0.6	USGS gage #03272200, 1960-67 data
		winter	2.1	USGS gage #03272200, 1960-67 data
Harmonic Mean Flow	cfs	annual	3.0	USGS gage #03272000, 1914-23, 27-97
<b>Bear Creek at Mouth</b>				
7Q10	cfs	summer	2.21	USGS gage #03272000, 1914-23, 27-97
		winter	4.02	USGS gage #03272000, 1914-23, 27-97
		annual	2.21	USGS gage #03272000, 1914-23, 27-97
1Q10	cfs	annual	2.1	USGS gage #03272000, 1914-23, 27-97
30Q10	cfs	summer	2.52	USGS gage #03272000, 1914-23, 27-97
		winter	5.38	USGS gage #03272000, 1914-23, 27-97
Harmonic Mean Flow	cfs	annual	8.14	USGS gage #03272000, 1914-23, 27-97
<b>Gregory Creek at Mouth</b>				
7Q10	cfs	summer	0.26	USGS gage #03272200, 1960-67 data
		winter	0.84	USGS gage #03272200, 1960-67 data
		annual	0.26	USGS gage #03272200, 1960-67 data
1Q10	cfs	annual	0.26	USGS gage #03272200, 1960-67 data
30Q10	cfs	summer	0.39	USGS gage #03272200, 1960-67 data
		winter	1.35	USGS gage #03272200, 1960-67 data
Harmonic Mean Flow	cfs	annual	1.93	USGS gage #03272000, 1914-23, 27-97
<b>Pleasant Run at Mouth</b>				
7Q10	cfs	summer	0.04	USGS gage #03274200, 1961-69 data
		winter	0.10	USGS gage #03274200, 1961-69 data
		annual	0.04	USGS gage #03274200, 1961-69 data
1Q10	cfs	annual	0.04	USGS gage #03274200, 1961-69 data
30Q10	cfs	summer	0.06	USGS gage #03274200, 1961-69 data
		winter	0.16	USGS gage #03274200, 1961-69 data
Harmonic Mean Flow	cfs	annual	0.23	USGS gage #03272800, 1960-72 data

Table 10. Instream Conditions and Discharger Flow - continued.

Parameter	Units		Value	Basis
<b>Banklick Creek at Mouth</b>				
7Q10	cfs	summer	0.01	USGS gage #03274200, 1961-69 data
		winter	0.03	USGS gage #03274200, 1961-69 data
		annual	0.01	USGS gage #03274200, 1961-69 data
1Q10	cfs	annual	0.01	USGS gage #03274200, 1961-69 data
30Q10	cfs	summer	0.02	USGS gage #03274200, 1961-69 data
		winter	0.05	USGS gage #03274200, 1961-69 data
Harmonic Mean Flow	cfs	annual	0.07	USGS gage #03272800, 1960-72 data
<b>Twomile Creek at Mouth</b>				
7Q10	cfs	summer	0.02	USGS gage #03274200, 1961-69 data
		winter	0.04	USGS gage #03274200, 1961-69 data
		annual	0.02	USGS gage #03274200, 1961-69 data
1Q10	cfs	annual	0.02	USGS gage #03274200, 1961-69 data
30Q10	cfs	summer	0.02	USGS gage #03274200, 1961-69 data
		winter	0.06	USGS gage #03274200, 1961-69 data
Harmonic Mean Flow	cfs	annual	0.10	USGS gage #03272800, 1960-72 data
<b>Paddy's Run at Mouth</b>				
7Q10	cfs	summer	0.03	USGS gage #03274200, 1961-69 data
		winter	0.08	USGS gage #03274200, 1961-69 data
		annual	0.03	USGS gage #03274200, 1961-69 data
1Q10	cfs	annual	0.03	USGS gage #03274200, 1961-69 data
30Q10	cfs	summer	0.05	USGS gage #03274200, 1961-69 data
		winter	0.13	USGS gage #03274200, 1961-69 data
Harmonic Mean Flow	cfs	annual	0.19	USGS gage #03272800, 1960-72 data
Instream Hardness	mg/l	annual	320.	STORET/LEAPS; 974 values, 1995-2001

Table 10. Instream Conditions and Discharger Flow - continued.

Parameter	Units		Value	Basis
<b>Background Water Quality</b>				
Aldrin	µg/l	annual	0.	No representative data available.
Alpha-BHC	µg/l	annual	0.	No representative data available.
Antimony	µg/l	annual	0.	No representative data available.
Arsenic	µg/l	annual	1.9	STORET; 8 values, 4<MDL, 1990-95
Barium	µg/l	annual	0.	No representative data available.
Beryllium	µg/l	annual	0.	No representative data available.
Bis (2-ethylhexyl) phthalate	µg/l	annual	0.	No representative data available.
Bis (2-chloroethyl) ether	µg/l	annual	0.	No representative data available.
Boron	µg/l	annual	0.	No representative data available.
Bromomethane	µg/l	annual	0.	No representative data available.
Cadmium	µg/l	annual	0.1	STORET; 22 values, 19<MDL, 1989-95
Chlorine, total res	µg/l	annual	0.	No representative data available.
Chloroform	µg/l	annual	0.	No representative data available.
Chromium <sup>+6</sup> , diss	µg/l	annual	0.	No representative data available.
Chromium, total	µg/l	annual	0.	STORET; 17 values, 17<MDL, 1989-94
Cobalt	µg/l	annual	0.	No representative data available.
Copper	µg/l	annual	5.	STORET; 22 values, 20<MDL, 1989-95
Cyanide, free	µg/l	annual	0.	No representative data available.
4,4'-DDE	µg/l	annual	0.	No representative data available.
4,4'-DDT	µg/l	annual	0.	No representative data available.
1,4-Dichlorobenzene	µg/l	annual	0.	No representative data available.
2,4-Dichlorophenol	µg/l	annual	0.	No representative data available.
Dieldrin	µg/l	annual	0.	No representative data available.
Endrin	µg/l	annual	0.	No representative data available.
Fluoride	µg/l	annual	0.	No representative data available.
Gamma-BHC	µg/l	annual	0.	No representative data available.
Heptachlor	µg/l	annual	0.	No representative data available.
Heptachlor epoxide	µg/l	annual	0.	No representative data available.
Hexachlorobenzene	µg/l	annual	0.	No representative data available.
Iron	µg/l	annual	1375.	STORET; 12 values, 0<MDL, 1989-94
Lead	µg/l	annual	1.	STORET; 22 values, 16<MDL, 1989-95
Mercury	µg/l	annual	0.	No representative data available.
Molybdenum	µg/l	annual	0.	No representative data available.
Nickel	µg/l	annual	0.	STORET; 22 values, 22<MDL, 1989-95
Nitrate+Nitrite	mg/l	annual	2.91	STORET; 34 values, 0<MDL, 1989-95
Selenium	µg/l	annual	1.25	STORET; 8 values, 7<MDL, 1990-95
Silver	µg/l	annual	0.	No representative data available.
Strontium	µg/l	annual	0.	No representative data available.
TDS	mg/l	annual	408.	STORET; 11 values, 0<MDL, 1990-95
2,4,6- Trichlorophenol	µg/l	annual	0.	No representative data available.
Zinc	µg/l	annual	10.	STORET; 22 values, 10<MDL, 1989-95
<b>USDOE Mound flows</b>				
Outfall 001	cfs	average	0.10	DSW
Outfall 002	cfs	average	1.01	DSW
Outfall 003	cfs	average	0.33	DSW

Table 11. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria for **outfall 001**.

Parameter	Units	Average			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Agri Supply	Aquatic Life		
Boron	µg/l	--	--	12080.	89190. <sup>A</sup>	17000.
Cadmium	µg/l	--	225. <sup>A</sup>	13.	36. <sup>A</sup>	34.
Chlorine, tot. res.	µg/l	--	--	21.	37.	38.
Copper	µg/l	4628. <sup>A</sup>	1777. <sup>A</sup>	45.	72.	84.
Fluoride	µg/l	--	43660.	--	--	--
Lead	µg/l	--	415.	56.	1035.	1100.
Molybdenum	µg/l	--	--	237.	4860. <sup>A</sup>	4700.
Nitrate+Nitrite	mg/l	--	6626.	--	--	--
Strontium	µg/l	--	--	1788.	15020. <sup>A</sup>	14000.
TDS	µg/l	--	--	2954000.	--	--
Zinc	µg/l	254300. <sup>A</sup>	92140. <sup>A</sup>	584.	553.	640.

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum.

Table 12. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria for **outfall 002**.

Parameter	Units	Average			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Agri Supply	Aquatic Life		
Alpha BHC	µg/l	24.	--	--	--	--
Barium	µg/l	--	--	489.	4272. <sup>A</sup>	4000.
Boron	µg/l	--	--	12080.	89190. <sup>A</sup>	17000.
Copper	µg/l	4628. <sup>A</sup>	1777. <sup>A</sup>	45.	72.	84.
Fluoride	µg/l	--	43660.	--	--	--
Hexachlorobenzene	µg/l	0.2	--	--	--	--
Molybdenum	µg/l	--	--	237.	4860. <sup>A</sup>	4700.
Selenium	µg/l	47340.	214.	9.7	--	--
Strontium	µg/l	--	--	1788.	15020. <sup>A</sup>	14000.
TDS	µg/l	--	--	2954000.	--	--
Zinc	µg/l	254300. <sup>A</sup>	92140. <sup>A</sup>	584.	553.	640.

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum.

Table 13. Summary of Effluent Limits to Maintain Applicable Water Quality Criteria, **outfall 003**.

Parameter	Units	Average			Maximum Aquatic Life	Inside Mixing Zone Maximum
		Human Health	Agri Supply	Aquatic Life		
Copper	µg/l	4628. <sup>A</sup>	1777. <sup>A</sup>	45.	72.	84.
Mercury	µg/l	.048	40. <sup>A</sup>	1.8	3.3	3.4
Selenium	µg/l	47340.	214.	9.7	--	--
TDS	µg/l	--	--	2954000.	--	--
Zinc	µg/l	254300. <sup>A</sup>	92140. <sup>A</sup>	584.	553.	640.

<sup>A</sup> Allocation must not exceed the Inside Mixing Zone Maximum.

Table 14. Parameter Assessment for outfall 001

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Acetone	Bromodichloromethane	Delta BHC
Dibromochloromethane	Methyl Ethyl Ketone	Phosphorus
Potassium		

Group 2:  $PEQ < 25\%$  of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional.

Barium	Bromoform	Carbon Tetrachloride
Chloroform	Chromium, tot	trans-1,2-Dichloroethylene
Iron	Mercury	Methylene Chloride
Nickel	1,1,2,2-Tetrachloroethane	Tetrachloroethylene
1,1,1-Trichloroethane	Vinyl Chloride	

Group 3:  $PEQ_{max} < 50\%$  of maximum PEL and  $PEQ_{avg} < 50\%$  of average PEL. No limit recommended, monitoring optional.

Boron	Fluoride	Molybdenum
Nitrate+Nitrite	Strontium	Zinc

Group 4:  $PEQ_{max} \geq 50\%$  but  $< 100\%$  of the maximum PEL or  $PEQ_{avg} \geq 50\%$  but  $< 100\%$  of the average PEL. Monitoring is appropriate.

Cadmium	TDS
---------	-----

Group 5: Maximum  $PEQ \geq 100\%$  of the maximum PEL or average  $PEQ \geq 100\%$  of the average PEL, or either the average or maximum  $PEQ$  is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

#### Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	<u>Recommended Effluent Limits</u>	
			Average	Maximum
Chlorine, tot. res.	$\mu\text{g/l}$	summer only	21.	37.
Copper	$\mu\text{g/l}$	annual	45.	72.
Lead	$\mu\text{g/l}$	annual	56.	1035.

Table 15. Parameter Assessment for outfall 002

Group 1: Due to a lack of criteria, the following parameters could not be evaluated at this time.

Aluminum	Manganese	Phenolics
Phosphorus	Potassium	

Group 2: PEQ < 25% of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional.

Cadmium	Iron	Nitrate+Nitrite
---------	------	-----------------

Group 3: PEQ<sub>max</sub> < 50% of maximum PEL and PEQ<sub>avg</sub> < 50% of average PEL. No limit recommended, monitoring optional.

Alpha BHC	Barium	Boron
Fluoride	Hexachlorobenzene	

Group 4: PEQ<sub>max</sub> ≥ 50% but < 100% of the maximum PEL or PEQ<sub>avg</sub> ≥ 50% but < 100% of the average PEL. Monitoring is appropriate.

Strontium

Group 5: Maximum PEQ ≥ 100% of the maximum PEL or average PEQ ≥ 100% of the average PEL, or either the average or maximum PEQ is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

Limits to Protect Numeric Water Quality Criteria

Parameter	Units	Applicable Period	<u>Recommended Effluent Limits</u>	
			Average	Maximum
Copper	µg/l	annual	45.	72.
Molybdenum	µg/l	annual	237.	4700.
Selenium	µg/l	annual	9.7	--
TDS	µg/l	annual	2954000.	--
Zinc	µg/l	annual	--	553.

<sup>A</sup> Additivity of carcinogens. Following are the human health limits for the carcinogens:

Substance	Parameter	Limits for Human Health (µg/l)
A	Alpha BHC	24.
B	Hexachlorobenzene	0.2

The following equation will be used to calculate the additivity factor:

$$\frac{MAC_A}{24. \mu g/l} + \frac{MAC_B}{0.2 \mu g/l} + \leq 1.0$$

where MAC = average concentration of all samples collected within the month.

**Table 16. Parameter Assessment for outfall 003**

**Group 1:** Due to a lack of criteria, the following parameters could not be evaluated at this time.

No parameters fit the criteria of this group.

**Group 2:**  $PEQ < 25\%$  of WQS or all data below minimum detection limit; WLA not required. No limit recommended, monitoring optional.

Bis (2-ethylhexyl) phthalate

Chromium, tot.

Lead

Nickel

Silver

Tetrachloroethylene

**Group 3:**  $PEQ_{max} < 50\%$  of maximum PEL and  $PEQ_{avg} < 50\%$  of average PEL. No limit recommended, monitoring optional.

Copper

TDS

Zinc

**Group 4:**  $PEQ_{max} \geq 50\%$  but  $< 100\%$  of the maximum PEL or  $PEQ_{avg} \geq 50\%$  but  $< 100\%$  of the average PEL. Monitoring is appropriate.

No parameters fit the criteria of this group.

**Group 5:** Maximum  $PEQ \geq 100\%$  of the maximum PEL or average  $PEQ \geq 100\%$  of the average PEL, or either the average or maximum  $PEQ$  is between 75 and 100% of the PEL and certain conditions that increase the risk to the environment are present. Limit recommended.

**Limits to Protect Numeric Water Quality Criteria**

Parameter	Units	Applicable Period	Recommended Effluent Limits	
			Average	Maximum
Mercury	µg/l	annual	.048	3.3
Selenium	µg/l	annual	9.7	—

Table 17. Final effluent limits and monitoring requirements for U.S.DOE - MEMP outfall 11000005001 and the basis for their recommendation.

Parameter	Units	Effluent Limits				Basis <sup>b</sup>
		Concentration		Loading (kg/day) <sup>a</sup>		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow	MGD	----- Monitor -----				M <sup>c</sup>
CBOD <sub>5</sub>	mg/l	10	15	2.5	3.7	ABS/EP
Suspended Solids	mg/l	15	30	3.7	7.4	ABS/EP
Dissolved Solids	mg/l	----- Monitor -----				M/RP <sup>c</sup>
Ammonia-N	mg/l	----- Monitor -----				M <sup>c</sup>
Nitrate/Nitrite-N	mg/l	----- Monitor -----				M <sup>c</sup>
Phosphorus	mg/l	----- Monitor -----				M <sup>c</sup>
Oil and Grease	mg/l	----- Monitor -----				M <sup>c</sup>
pH	S.U.	----- 6.5 to 9.0 -----				WQS
Fecal coliform	#/100ml	1000	2000	—	—	WQS
Chlorine Residual	mg/l	—	0.037	—	—	WLA
Cadmium, T. R.	µg/l	----- Monitor -----				M/RP <sup>c</sup>
Copper, T. R.	µg/l	—	84	—	0.021	WLA/IMZM
Lead, T. R.	µg/l	56	1035	0.014	0.25	WLA
Zinc, T. R.	µg/l	----- Monitor -----				M <sup>c</sup>
Carbon Tetrachloride	µg/l	----- Monitor -----				M <sup>c</sup>
Chloroform	µg/l	----- Monitor -----				M <sup>c</sup>
Methylene Chloride	µg/l	----- Monitor -----				M <sup>c</sup>
1,1,1-Trichloroethane	µg/l	----- Monitor -----				M <sup>c</sup>
1,1,2,2-Tetrachloroethane	µg/l	----- Monitor -----				M <sup>c</sup>
trans-1,2-Dichloroethylene	µg/l	----- Monitor -----				M <sup>c</sup>
Vinyl Chloride	µg/l	----- Monitor -----				M <sup>c</sup>
Acetone	µg/l	----- Monitor -----				M <sup>c</sup>
2-Butanone (MEK)	µg/l	----- Monitor -----				M <sup>c</sup>
Whole Effluent Toxicity						
Acute	TUa	----- Monitor (w/o trigger) -----				WET

Table 17. Continued.

- Effluent loadings based on average design discharge flow of 0.065 MGD.
- Definitions: ABS = Antibacksliding Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l)); AD = Antidegradation (OAC 3745-1-05); BPJ = Best Professional Judgment; EP = Existing Permit; M = Monitoring; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WET = Whole Effluent Toxicity (OAC 3745-33-07(B)) ; WLA = Wasteload Allocation procedures (OAC 3745-2); WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum; WQS = Ohio Water Quality Standards (OAC 3745-1).
- Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

Table 18. Final effluent limits and monitoring requirements for U.S.DOE - MEMP outfall 11000005002 and the basis for their recommendation.

Parameter	Units	Effluent Limits				Basis <sup>b</sup>
		Concentration		Loading (kg/day) <sup>a</sup>		
		30 Day Average	Daily Maximum	30 Day Average	Daily Maximum	
Flow	MGD	----- Monitor -----				M <sup>c</sup>
COD	mg/l	----- Monitor -----				M <sup>c</sup>
Suspended Solids	mg/l	30	45*	—	—	ABS/EP
Dissolved Solids	mg/l	----- Monitor -----				M/RP <sup>c</sup>
Oil and Grease	mg/l	—	10	—	—	WQS
Copper, T. R.	µg/l	45	72	0.11	0.18	WLA
Molybdenum, T. R.	µg/l	----- Monitor -----				M/RP <sup>c</sup>
Selenium, T. R.	µg/l	----- Monitor -----				M/RP <sup>c</sup>
Strontium	µg/l	----- Monitor -----				M/RP <sup>c</sup>
Zinc, T. R.	µg/l	----- Monitor -----				M/RP <sup>c</sup>
Whole Effluent Toxicity						
Acute	TUa	----- Monitor (w/ PPE) -----				WET
Chronic	TUc	----- Monitor (w/ PPE) -----				WET

<sup>a</sup> Effluent loadings based on average design discharge flow of 0.65 MGD.

<sup>b</sup> Definitions: ABS = Antidegradation Rule (OAC 3745-33-05(E) and 40 CFR Part 122.44(l)); AD = Antidegradation (OAC 3745-1-05); BPJ = Best Professional Judgment; EP = Existing Permit; M = Monitoring; RP = Reasonable Potential for requiring water quality-based effluent limits and monitoring requirements in NPDES permits (3745-33-07(A)); WET = Whole Effluent Toxicity (OAC 3745-33-07(B)); WLA = Wasteload Allocation procedures (OAC 3745-2); WLA/IMZM = Wasteload Allocation limited by Inside Mixing Zone Maximum; WQS = Ohio Water Quality Standards (OAC 3745-1).

<sup>c</sup> Monitoring of flow and other indicator parameters is specified to assist in the evaluation of effluent quality and treatment plant performance.

- This limit does not apply during an OEPA week in which rain equal to or greater than ½ inch occurs within 24 hours or in which rain equal to or greater than 1/4 inch per day occurs for two or more days.